

Complete IDDSI Framework Detailed definitions

INTRODUCTION

The International Dysphagia Diet Standardisation Initiative (IDDSI) was founded in 2013 with the goal of developing new global standardised terminology and definitions to describe texture modified foods and thickened liquids used for individuals with dysphagia of all ages, in all care settings, and all cultures.

Three years of ongoing work by the International Dysphagia Diet Standardisation Committee has culminated in a final dysphagia diet framework consisting of a continuum of 8 levels (0-7). Levels are identified by numbers, text labels and colour codes.

This document provides detailed descriptors for all levels of the IDDSI Framework. Descriptors are supported by simple measurement methods that can be used by people with dysphagia or by caregivers, clinicians, food service professionals or industry to confirm the level a food fits into.

This document is to be read in conjunction with IDDSI Testing Methods, IDDSI Evidence and IDDSI Frequently Asked Questions (FAQs) documents (<http://iddsi.org/framework/>).

The IDDSI Committee would like to acknowledge the interest and participation of the global community including patients, caregivers, health professionals, industry, professional associations and researchers. We would also like to thank our sponsors for their generous support.

Please visit the www.iddsi.org for further information

The IDDSI Committee:

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Committee Members: Jianshe Chen (CHN), Roberto Dantas (BRA), Janice Duivesteyn (CAN), Ben Hanson (UK), Jun Kayashita (JPN), Caroline Lecko (UK), Mershen Pillay (ZAF), Luis Riquelme (USA), Soenke Stanschus (GER), Catriona Steele (CAN).

Past Committee Members: Joe Murray (USA)

The International Dysphagia Diet Standardisation Initiative Inc. (IDDSI) is an independent, not-for-profit entity. IDDSI is grateful to a large number of agencies, organizations and industry partners for financial and other support. Sponsors have not been involved with the design or development of the IDDSI framework.

Development of the IDDSI framework (2012-2015)

IDDSI would like to thank and acknowledge the following sponsors for their generous support in the development of the IDDSI framework:

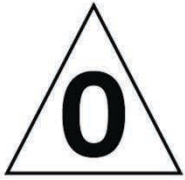
- Nestlé Nutrition Institute (2012-2015)
- Nutricia Advanced Medical Nutrition (2013-2014)
- Hormel Thick & Easy (2014-2015)
- Campbell's Food Service (2013-2015)
- apetito (2013-2015)
- Trisco (2013-2015)
- Food Care Co. Ltd. Japan (2015)
- Flavour Creations (2013-2015)
- Simply Thick (2015)
- Lyons (2015)

Implementation of the IDDSI framework is in progress. IDDSI is extremely grateful to all sponsors supporting implementation <http://iddsi.org/about-us/sponsors/>

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THIN



Description/ Characteristics	<ul style="list-style-type: none">• Flows like water• Fast flow• Can drink through any type of teat/nipple, cup or straw as appropriate for age and skills
Physiological rationale for this level of thickness	<ul style="list-style-type: none">• Functional ability to safely manage liquids of all types
Testing method See also <i>IDDSI Testing Methods</i> document or http://iddsi.org/framework/drink-testing-methods/	
IDDSI Flow Test*	<ul style="list-style-type: none">• Test liquid flows through a 10 mL slip tip syringe completely within 10 seconds, leaving no residue (see IDDSI Flow Test instructions*)



SLIGHTLY THICK



Description/ Characteristics	<ul style="list-style-type: none">• Thicker than water• Requires a little more effort to drink than thin liquids• Flows through a straw, syringe, teat/nipple• Similar to the thickness of commercially available 'Anti-regurgitation' (AR) infant formula
Physiological rationale for this level of thickness	<ul style="list-style-type: none">• Predominantly used in the paediatric population as a thickened drink that reduces speed of flow yet is still able to flow through an infant teat/nipple. Consideration to flow through a teat/nipple should be determined on a case-by-case basis.
Testing method See also <i>IDDSI Testing Methods</i> document or http://iddsi.org/framework/drink-testing-methods/	
IDDSI Flow Test*	<ul style="list-style-type: none">• Test liquid flows through a 10 mL slip tip syringe leaving 1-4 mL in the syringe after 10 seconds (see IDDSI Flow Test instructions*)



MILDLY THICK



Description/ Characteristics	<ul style="list-style-type: none">• Flows off a spoon• Sippable, pours quickly from a spoon, but slower than thin drinks• Effort is required to drink this thickness through standard bore straw (standard bore straw = 0.209 inch or 5.3 mm diameter)
Physiological rationale for this level of thickness	<ul style="list-style-type: none">• If thin drinks flow too fast to be controlled safely, these Mildly Thick liquids will flow at a slightly slower rate• May be suitable if tongue control is slightly reduced.

TESTING METHOD

See also IDDSI Testing Methods document or <http://iddsi.org/framework/drink-testing-methods/>

IDDSI Flow Test*	<ul style="list-style-type: none">• Test liquid flows through a 10 mL slip tip syringe leaving 4 to 8 ml in the syringe after 10 seconds (see IDDSI Flow Test instructions*)
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LIQUIDISED

MODERATELY THICK



<p>Description/characteristics</p> <p>Texture restrictions shown in summary table</p>	<ul style="list-style-type: none"> • Can be drunk from a cup • Some effort is required to suck through a standard bore or wide bore straw (wide bore straw = 0.275 inch or 6.9 mm) • Cannot be piped, layered or moulded on a plate • Cannot be eaten with a fork because it drips slowly in dollops through the prongs • Can be eaten with a spoon • No oral processing or chewing required – can be swallowed directly • Smooth texture with no ‘bits’ (lumps, fibers, bits of shell or skin, husk, particles of gristle or bone)
<p>Physiological rationale for this level of thickness</p>	<ul style="list-style-type: none"> • If tongue control is insufficient to manage Mildly Thick drinks (Level 2), this Liquidised/Moderately thick level may be suitable • Allows more time for oral control • Needs some tongue propulsion effort • Pain on swallowing

TESTING METHODS

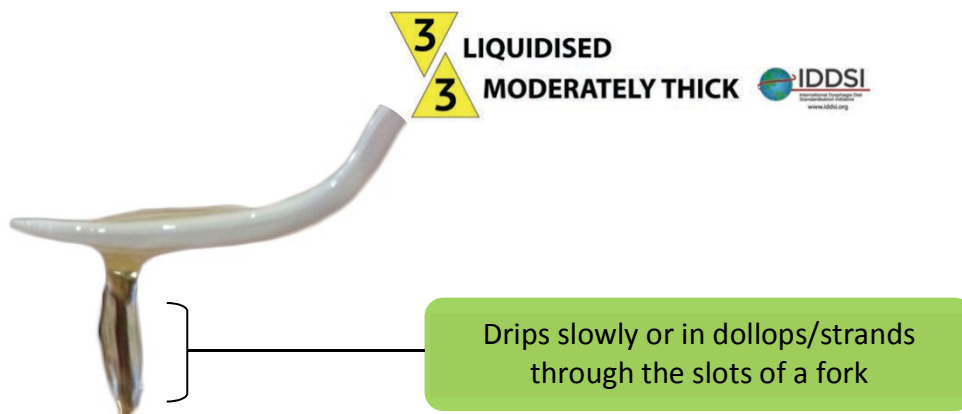
See also *IDDSI Testing Methods* document or <http://iddsi.org/framework/drink-testing-methods/> and <http://iddsi.org/framework/food-testing-methods/>

<p>IDDSI Flow Test*</p>	<ul style="list-style-type: none"> • Test liquid flows through a 10 ml slip tip syringe leaving > 8 ml in the syringe after 10 seconds (see Syringe Test Guide*)
<p>Fork Drip Test</p>	<ul style="list-style-type: none"> • Drips slowly in dollops through the prongs of a fork • Tines/Prongs of a fork do <u>not</u> leave a clear pattern on the surface • Spreads out if spilled onto a flat surface
<p>Spoon Tilt Test</p>	<ul style="list-style-type: none"> • Easily pours from spoon when tilted; does not stick to spoon
<p>Chopstick Test</p>	<ul style="list-style-type: none"> • Chopsticks are not suitable for this texture
<p>Finger Test</p>	<ul style="list-style-type: none"> • It is not possible to hold a sample of this food texture using fingers, however, this texture slides smoothly and easily between the thumb and fingers, leaving a coating

**Food specific or
Other examples
(NB. this list is not exhaustive)**

The following items may fit into IDDSI Level 3:

- Infant “first foods” (runny rice cereal or runny pureed fruit)
- Sauces and gravies
- Fruit syrup





PUREED EXTREMELY THICK



<p>Description/characteristics</p> <p>Texture restrictions shown in summary table</p>	<ul style="list-style-type: none"> • Usually eaten with a spoon (a fork is possible) • Cannot be drunk from a cup • Cannot be sucked through a straw • Does not require chewing • Can be piped, layered or molded • Shows some very slow movement under gravity but cannot be poured • Falls off spoon in a single spoonful when tilted and continues to hold shape on a plate • No lumps • <u>Not sticky</u> • Liquid must not separate from solid
<p>Physiological rationale for this level of thickness</p>	<ul style="list-style-type: none"> • If tongue control is significantly reduced, this category may be easiest to manage • Requires less propulsion effort than Minced & Moist (level 5), Soft & Bite-Sized (Level 6) and Regular (Level 7) but more than Liquidised/Moderately thick (Level 3) • No biting or chewing is required • Increased residue is a risk if too sticky • Any food that requires chewing, controlled manipulation or bolus formation are <u>not</u> suitable • Pain on chewing or swallowing • Missing teeth, poorly fitting dentures

TESTING METHODS

See also *IDDSI Testing Methods* document or <http://iddsi.org/framework/food-testing-methods/>

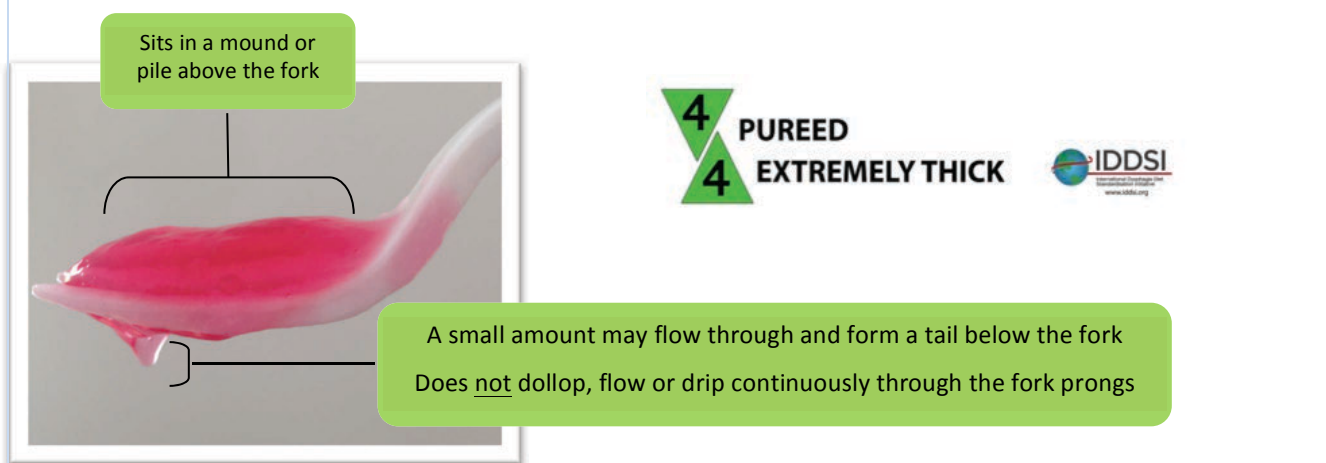
<p>IDDSI Flow test*</p>	<ul style="list-style-type: none"> • n/a Flow test not applicable, please revert to Fork Drip Test and Spoon Tilt Test
<p>Fork Pressure test</p>	<ul style="list-style-type: none"> • The tines/prongs of a fork can make a clear pattern on the surface, and/or the food retains the indentation from the fork • No lumps
<p>Fork Drip test</p>	<ul style="list-style-type: none"> • Sample sits in a mound/pile above the fork; a small amount may

Fork Drip test contd.	flow through and form a tail below the fork tines/prongs, but it <u>does not</u> flow or drip <u>continuously</u> through the prongs of a fork
Spoon Tilt test	<ul style="list-style-type: none"> • Cohesive enough to hold its shape on the spoon • A full spoonful must plop off the spoon if the spoon is titled or turned sideways; a very gentle flick may be necessary to dislodge the sample from the spoon, but the sample should slide off easily with very little food left on the spoon; i.e. the sample should <u>not</u> be firm and sticky • May spread out slightly or slump very slowly on a flat plate
Chopstick test	<ul style="list-style-type: none"> • Chopsticks are not suitable for this texture
Finger test	<ul style="list-style-type: none"> • It is just possible to hold a sample of this texture using fingers. The texture slides smoothly and easily between the fingers and leaves noticeable residue
Indicators that a sample is too thick	<ul style="list-style-type: none"> • Does not fall off the spoon when tilted • Sticks to spoon

FOOD SPECIFIC OR OTHER EXAMPLES

The following item may be suitable for IDDSI Level 4:

- Purees suitable for infants (e.g. pureed meat, thick cereal)



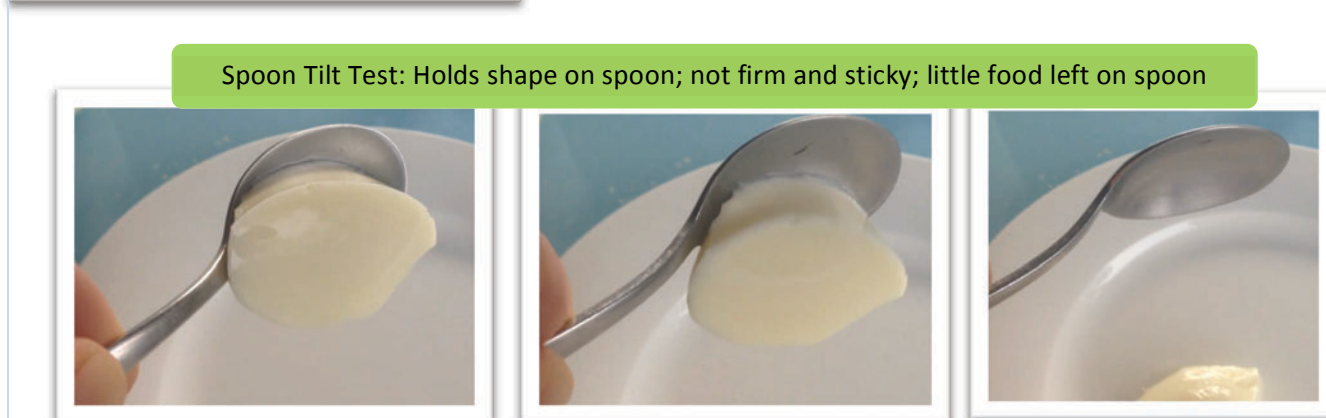
Sits in a mound or pile above the fork

4 PUREED
4 EXTREMELY THICK

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A small amount may flow through and form a tail below the fork
Does not dollop, flow or drip continuously through the fork prongs

Spoon Tilt Test: Holds shape on spoon; not firm and sticky; little food left on spoon





MINCED & MOIST



<p>Description/characteristics</p> <p>Texture restrictions shown in summary table</p>	<ul style="list-style-type: none"> • Can be eaten with a fork or spoon • Could be eaten with chopsticks in some cases, if the individual has very good hand control • Can be scooped and shaped (e.g. into a ball shape) on a plate • Soft and moist with no separate thin liquid • Small lumps visible within the food <ul style="list-style-type: none"> ➤ Paediatric, 2 mm lump size ➤ Adult, 4mm lump size • Lumps are easy to squash with tongue
<p>Physiological rationale for this level of thickness</p>	<ul style="list-style-type: none"> • Biting is not required • Minimal chewing is required • Tongue force alone can be used to break soft small particles in this texture • Tongue force is required to move the bolus • Pain or fatigue on chewing • Missing teeth, poorly fitting dentures

TESTING METHODS

See also *IDDSI Testing Methods* document or <http://iddsi.org/framework/food-testing-methods/>

<p>Fork Pressure test</p>	<ul style="list-style-type: none"> • When pressed with a fork the particles should easily be separated between and come through the tines/prongs of a fork • Can be easily mashed with little pressure from a fork [pressure should <u>not</u> make the thumb nail blanch to white]
<p>Fork Drip test</p>	<ul style="list-style-type: none"> • A scooped sample sits in a pile or can mound on the fork and does not easily or completely flow or fall through the tines/prongs of a fork
<p>Spoon Tilt test</p>	<ul style="list-style-type: none"> • Cohesive enough to hold its shape on the spoon • A full spoonful must slide/pour off the spoon if the spoon is tilted or turned sideways or shaken lightly; the sample should slide off easily with very little food left on the spoon; i.e. the sample should <u>not</u> be sticky • A scooped mound may spread or slump very slightly on a plate
<p>Chopstick test</p>	<ul style="list-style-type: none"> • Chopsticks can be used to scoop or hold this texture if the sample is moist and cohesive <i>and</i> the person has very good

Chopstick test contd.	hand control to use chopsticks
Finger test	<ul style="list-style-type: none"> It is possible to easily hold a sample of this texture using fingers; small soft, smooth, rounded particles can be easily squashed between fingers. The material will feel moist and leave fingers wet.

FOOD SPECIFIC OR OTHER EXAMPLES <http://iddsi.org/framework/food-testing-methods/>

MEAT

- Finely minced or chopped, tender mince
 - Paediatric, 2mm lump size*
 - Adult, 4mm lump size*
- Serve in extremely thick, smooth, non-pouring sauce or gravy
- *If texture cannot be finely minced it should be pureed

FISH

- Finely mashed in extremely thick smooth, non-pouring sauce or gravy
 - Paediatric, 2mm lump size*
 - Adult, 4mm lump size*

FRUIT

- Serve mashed
- Drain excess juice
 - Paediatric, 2mm lump size*
 - Adult, 4mm lump size*

VEGETABLES

- Finely minced or chopped or mashed
- Drain any liquid
 - Paediatric, 2mm lump size*
 - Adult, 4mm lump size*

CEREAL

- Very thick and smooth with small soft lumps
 - Paediatric, 2mm lump size*
 - Adult, 4mm lump size*
- Texture fully softened
- Any milk/fluid must not separate away from cereal. Drain any excess fluid before serving

BREAD

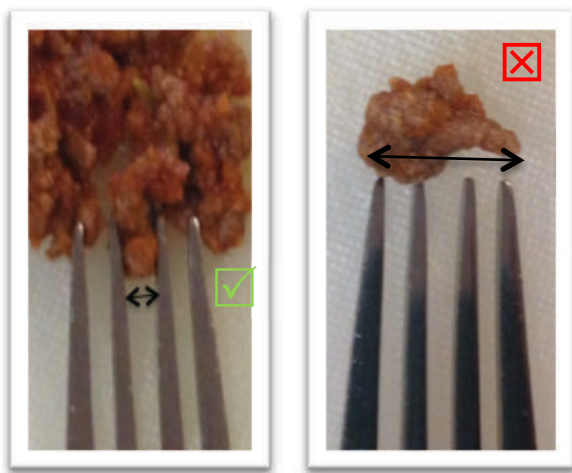
- Pre-gelled 'soaked' breads that are very moist and gelled through the entire thickness
- No regular, dry bread

RICE

- Not sticky or glutinous (particularly short grain rice) and should not be particulate or separate into individual grains when cooked and served (particularly long grain rice)

5 MINCED & MOIST 

Use slot between fork prongs (4mm) to determine whether minced pieces are the correct or incorrect size



Note - lump size requirements for all foods in Level 5 Minced & Moist:

- Paediatric, 2mm lump size
- Adult, 4mm lump size



SOFT & BITE-SIZED



<p>Description/characteristics</p> <p>Texture restrictions shown in summary table</p>	<ul style="list-style-type: none"> • Can be eaten with a fork, spoon or chopsticks • Can be mashed/broken down with pressure from fork, spoon or chopsticks • A knife is not required to cut this food, but may be used to help loading a fork or spoon • Chewing is required before swallowing • Soft, tender and moist throughout but with no separate thin liquid • 'Bite-sized' pieces as appropriate for size and oral processing skills <ul style="list-style-type: none"> ➤ Paediatric, 8mm pieces ➤ Adults, 15 mm = 1.5 cm pieces
<p>Physiological rationale for this level of thickness</p>	<ul style="list-style-type: none"> • Biting is not required • Chewing is required • Tongue force and control is required to move the food for chewing and to keep it within the mouth during chewing • Tongue force is required to move the bolus for swallowing • Pain or fatigue on chewing • Missing teeth, poorly fitting dentures

TESTING METHODS

See also *IDDSI Testing Methods* document or <http://iddsi.org/framework/food-testing-methods/>

<p>Fork Pressure test</p>	<ul style="list-style-type: none"> • Pressure from a fork held on its side can be used to 'cut' or break this texture into smaller pieces • When a sample the size of a thumb nail (1.5x1.5 cm) is pressed with the base of a fork to a pressure where the thumb nail blanches to white, the sample squashes and changes shape, and does not return to its original shape when the fork is removed.
<p>Spoon Pressure test</p>	<ul style="list-style-type: none"> • Pressure from a spoon held on its side can be used to 'cut' or break this texture into smaller pieces. • When a sample the size of a thumb nail (1.5 cm x1.5 cm) is pressed with the bowl of a spoon, the sample squashes and changes shape, and does not return to its original shape when the spoon is removed.
<p>Chopstick test</p>	<ul style="list-style-type: none"> • Chopsticks can be used to break this texture into smaller pieces

Finger test	<ul style="list-style-type: none"> Use a sample the size of a thumb nail (1.5 cm x 1.5 cm). It is possible to squash a sample of this texture using finger pressure such that the thumb and index finger nails blanch to white. The sample will not return to its initial shape once pressure is released.
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FOOD SPECIFIC OR OTHER EXAMPLES

<p>MEAT</p> <ul style="list-style-type: none"> <u>Cooked</u>, tender meat no bigger than <ul style="list-style-type: none"> <i>Paediatric, 8mm pieces</i> <i>Adults, 15 mm = 1.5 x 1.5 cm pieces</i> If texture cannot be served soft and tender at 1.5 cm x 1.5 cm, serve minced and moist <p>FISH</p> <ul style="list-style-type: none"> Soft enough cooked fish to break into small pieces with fork, spoon or chopsticks no larger than <ul style="list-style-type: none"> <i>Paediatric, 8mm pieces</i> <i>Adults, 15 mm = 1.5 cm pieces</i> No bones <p>CASSEROLE/STEW/CURRY</p> <ul style="list-style-type: none"> Liquid portion must be thick (as per clinician recommendations; refer to IDDSI levels 0-4) Can contain meat, fish or vegetables if final cooked pieces are soft and tender and no larger than <ul style="list-style-type: none"> <i>Paediatric, 8mm pieces</i> <i>Adults, 15 mm = 1.5 cm pieces</i> No hard lumps <p>FRUIT</p> <ul style="list-style-type: none"> Serve mashed <ul style="list-style-type: none"> <i>Paediatric, 8mm pieces</i> <i>Adults, 15 mm = 1.5 cm pieces</i> Fibrous parts of fruit are not suitable Drain excess juice Assess individual ability to manage fruit with high water content (e.g. watermelon) where juice separates from solid in the mouth during chewing <p>VEGETABLES</p> <ul style="list-style-type: none"> Steamed or boiled vegetables with final cooked size of <ul style="list-style-type: none"> <i>Paediatric, 8mm pieces</i> <i>Adults, 15 mm = 1.5 cm pieces</i> Stir fried vegetables are often <u>too firm</u> and are <u>not soft</u> or tender <p>Contd.</p>	<div style="border: 1px solid black; padding: 5px;"> <p>Note - food size requirements for all foods in Level 6 Soft & Bite-sized:</p> <ul style="list-style-type: none"> ➤ Paediatric, 8mm pieces ➤ Adult, 15mm = 1.5cm pieces </div>
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CEREAL

- Smooth with soft tender lumps no bigger than
 - *Paediatric, 8mm pieces*
 - *Adults, 15 mm = 1.5 cm pieces*
- Texture fully softened
- Any excess milk or fluid must drained

BREAD

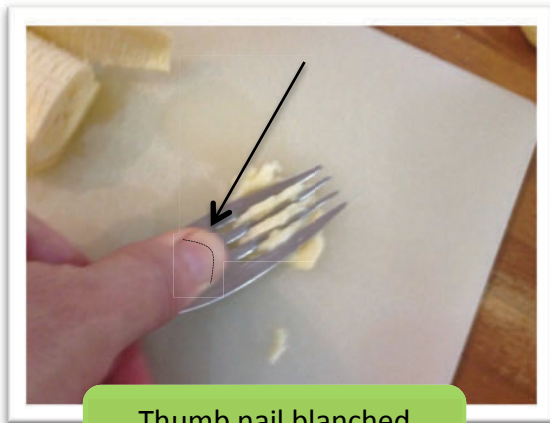
- Pre-gelled 'soaked' breads that are very moist and gelled through the entire thickness
- No regular dry bread unless assessed as suitable by dysphagia specialist, on an individual basis (if considered appropriate bread must also conform to paediatric 8mm, and adult 1.5 x1.5 cm size requirements)

RICE

- Not particulate/grainy, sticky or glutinous



SOFT & BITE-SIZED



Thumb nail blanching to white



Sample squashes and does not return to its original shape when pressure is released



REGULAR



Description/characteristics

There are NO texture restrictions at this level

- Normal, everyday foods of various textures that are developmentally and age appropriate
- Any method may be used to eat these foods
- Foods may be hard and crunchy or naturally soft
- Sample size is not restricted at Level 7, therefore, foods may be of a **range of sizes**
 - Smaller or greater than 8mm pieces (Paediatric)
 - Smaller or greater than 15 mm = 1.5 cm pieces (Adults)
- Includes hard, tough, chewy, fibrous, stringy, dry, crispy, crunchy, or crumbly bits
- Includes food that contains pips, seeds, pith inside skin, husks or bones
- Includes 'dual consistency' or 'mixed consistency' foods and liquids

Physiological rationale for this level of thickness

- Ability to bite hard or soft foods and chew them for long enough that they form a soft cohesive ball/bolus that is 'swallow ready'
- An ability to chew all food textures without tiring easily
- An ability to remove bone or gristle that cannot be swallowed safely from the mouth

TESTING METHOD

- Not Applicable

TRANSITIONAL FOODS



Description/characteristics	<ul style="list-style-type: none"> • Food that starts as one texture (e.g. firm solid) and changes into another texture specifically when moisture (e.g. water or saliva) is applied, or when a change in temperature occurs (e.g. heating)
Physiological rationale for this level of thickness	<ul style="list-style-type: none"> • Biting not required • Minimal chewing required • Tongue can be used to break these foods once altered by temperature or with addition of moisture/saliva ➤ May be used for developmental teaching or rehabilitation of chewing skills (e.g. development of chewing in the paediatric population and developmental disability population; rehabilitation of chewing function post stroke)

TESTING METHOD

See also *IDDSI Testing Methods* document or <http://iddsi.org/framework/food-testing-methods/>

Fork pressure test	<ul style="list-style-type: none"> • After moisture or temperature has been applied, the sample can be easily deformed and does not recover its shape when the force is lifted. • Use a sample the size of the thumb nail (1.5 cm x 1.5 cm), place 1 ml of water on the sample and wait one minute. Apply fork pressure using the base of the fork until the thumbnail blanches to white. The sample is a transitional food texture if after removing the fork pressure: <ul style="list-style-type: none"> • The sample has been squashed and disintegrated and no longer looks like its original state • Or it has melted significantly and no longer looks like its original state (e.g. ice chips).
Spoon pressure test	<ul style="list-style-type: none"> • As above, using the bowl of the spoon in place of the fork
Chopstick test	<ul style="list-style-type: none"> • Use a sample the size of the thumb nail (1.5 cm x 1.5 cm), place 1 ml of water on the sample and wait one minute. The sample should be easily broken apart using chopsticks with minimal pressure.

Finger test	<ul style="list-style-type: none"> Use a sample the size of the thumb nail (1.5 cm x 1.5 cm), place 1 ml of water on the sample and wait one minute. The sample will break apart completely by rubbing the sample between the thumb and index finger. The sample will not return to its initial shape
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FOOD SPECIFIC OR OTHER EXAMPLES

IDDSI Transitional Foods may include and are not limited to:

- Ice chips
- Ice cream/Sherbet if assessed as suitable by a Dysphagia specialist
- Japanese Dysphagia Training Jelly sliced 1 mm x 15 mm
- Wafers (also includes Religious Communion wafer)
- Waffle cones used to hold ice cream
- Some biscuits/ cookies/ crackers
- Potato crisps – only the mashed type (e.g. Pringles)
- Shortbread
- Prawn crisps

Specific examples used in paediatric or adult disability dysphagia management

Commercially available foods[#] that are transitional foods textures include but are not limited to:

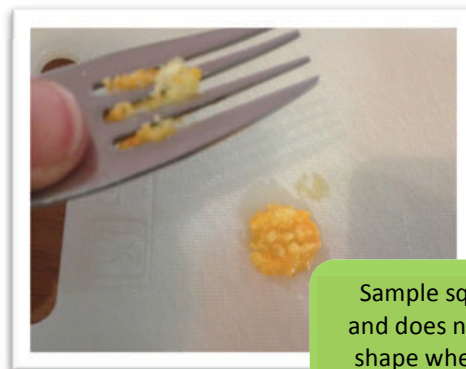
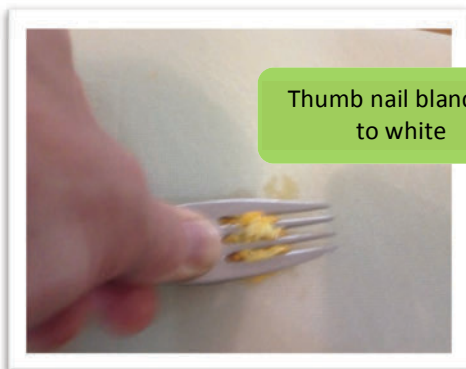
- Veggie Stix™
- Cheeto Puffs™
- Rice Puffs™
- Baby Mum Mums™
- Gerber Graduate Puffs™

[#]The mention of certain manufacturers’ products does not imply that they are endorsed or recommended in preference to others of a similar nature that are not mentioned.

TRANSITIONAL FOODS



- Apply 1 ml of water to sample
- Wait 1 minute































FOOD TEXTURE REQUIREMENTS



A green shaded check mark  in the summary table below indicates a characteristic that is required and acceptable for foods in each level.


A red shaded  in the summary table below indicates a food characteristic that is not acceptable for foods in each level.









Description/Characteristics	3 Liquidised/ Moderately thick	4 Pureed/ Extremely thick	5 Minced & moist	6 Soft & bite- sized
No skin, no crust even after cooking, heating or standing				
No separation of thin (watery) liquid				
Will hold its shape on a plate, fork or spoon				
Soft grainy texture quality				
Visible lumps				
Can contain soft, smooth, rounded, moist, small (2-4 mm) lumps if tender throughout				
Can contain soft, moist large (8-15 mm) lumps if tender throughout				

FOOD TEXTURE RESTRICTIONS



A green shaded check mark  in the summary table below indicates a characteristic that is acceptable and may be included for foods in each level.

A red shaded  in the summary table below indicates a food characteristic that is not acceptable and must be avoided for foods in each level.

Description/Characteristics	3 Liquidised/ Moderately thick	4 Pureed/ Extremely thick	5 Minced & moist	6 Soft & bite- sized	7 Regular
Mixed thin-thick textures (e.g. soup with pieces of food, cereal with milk; bubble tea)					
Hard or dry food (e.g. nuts, raw carrot, apple, crackling, hard crusty rolls)					
Fibrous or tough (e.g. steak, pineapple)					
Chewy (e.g. lollies/candies/sweets, cheese chunks, marshmallows, chewing gum, sticky mashed potato, dried fruits)					
Crispy (e.g. crackling, crisp bacon, cornflakes)					
Crunchy (e.g. raw carrot, raw apple, popcorn)					
Sharp or spiky (e.g. corn chips)					
Crumbly bits (e.g. crumbly dry cakes or biscuits)					
Pips, seeds, pith (e.g. apple seeds, orange pith)					
Skins or outer shells (e.g. peas, grapes)					
Husks (e.g. psyllium, bran)					
Skin (e.g. chicken skin, salmon skin)					
Bone or gristle (e.g. chicken bones, fish bones)					
Round, long shaped foods (e.g. sausage, grapes)					
Sticky or Gummy foods (e.g. nut butter, overcooked oatmeal, edible gelatin; Konjac containing jelly, sticky rice cakes)					
Stringy foods (e.g. beans, rhubarb)					
Hard pieces, skins or crusts formed during cooking or heating					

Description/Characteristics	3 Liquidised/ Moderately thick	4 Pureed/ Extremely thick	5 Minced & moist	6 Soft & bite- sized	7 Regular
'Floppy' textures (e.g. lettuce, cucumber, baby spinach leaves)	✘	✘	✘	✘	✔
'Juicy' food where the juice separates from the solid in the mouth (e.g. watermelon)	✘	✘	✘	✘	✔

*Accompanying documents (<http://iddsi.org/framework/>):

- IDDSI Testing Methods
- IDDSI Evidence
- IDDSI Frequently Asked Questions (FAQs)

INTRODUCTION

The International Dysphagia Diet Standardisation Initiative (IDDSI) was founded in 2013 with the goal of developing new global standardised terminology and definitions to describe texture modified foods and thickened liquids used for individuals with dysphagia of all ages, in all care settings, and all cultures.

Three years of ongoing work by the International Dysphagia Diet Standardisation Committee has culminated in a final dysphagia diet framework consisting of a continuum of 8 levels (0-7). Levels are identified by numbers, text labels and colour codes.

This document provides details regarding Testing Methods for use with the IDDSI Framework.

This document is to be read in conjunction with the Complete IDDSI Framework, IDDSI Evidence and IDDSI Frequently Asked Questions (FAQs) documents (<http://iddsi.org/resources/framework/>).

The IDDSI Committee would like to acknowledge the interest and participation of the global community including patients, caregivers, health professionals, industry, professional associations and researchers. We would also like to thank our sponsors for their generous support.

Please visit the www.iddsi.org for further information

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Development of the IDDSI framework (2012-2015)

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- Simply Thick (2015)
- Lyons (2015)

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Testing Methods for use with the IDDSI Framework

The IDDSI systematic review suggested that liquids and food should be classified in the context of the physiological processes involved in oral processing, oral transport and flow initiation. To this end, different devices are needed to best describe the behaviour of the bolus (Steele et al., 2015).

Drinks and other liquids

Accurate measurement of fluid flow properties is a complex task. To date, both research and existing national terminologies, have studied or recommended the classification of drinks based on viscosity. However, viscosity measurement is not accessible to most clinicians or caregivers.

Furthermore, viscosity is not the only relevant parameter: the flow of a drink as it is consumed is influenced by many other variables including density, yield stress, temperature, propulsion pressure and fat content (O'Leary et al., 2010; Sopade et al., 2007, Sopade et al., 2008a,b; Hadde et al. 2015a,b). The systematic review demonstrated wide variability in testing techniques used and found that other key parameters such as shear rates, sample temperature, density and yield stress were rarely reported (Steele et al., 2015; Cichero et al., 2013). Drinks thickened with different thickening agents may have the same measurement of apparent viscosity at one particular shear rate, and yet have very different flow characteristics in practice (Steele et al. 2015; O'Leary et al., 2010; Funami et al., 2012; Ashida et al., 2007; Garcia et al., 2005). In addition to variations in flow associated with drink characteristics, flow rates during swallowing are expected to differ depending on a person's age and level of impairment of swallowing function (O'Leary et al., 2010).

For these reasons, a measurement of viscosity has *not* been included in the IDDSI descriptors. Instead, a gravity flow test using a 10 mL slip tip syringe is recommended to quantify the liquid's flow category (sample remaining from 10 mL after 10 sec of flow). The controlled conditions are broadly representative of drinking through a straw or beaker.

The IDDSI Flow test is also similar in design and measurement principles to the Posthumus Funnel that is used in the dairy industry to measure liquid thickness (van Vliet, 2002; Kutter et al., 2011). In fact the Posthumus funnel looks like a large syringe (van Vliet, 2002; Kutter et al., 2011). Measures taken using the Posthumus funnel include the time for a specified amount of sample to flow, and mass left after a defined period of flow. Van Vliet (2002) notes that the geometry of the Posthumus funnel contains a shear and elongation component that more closely matches flow conditions within the oral cavity.

Although the syringe chosen for use with the IDDSI Flow test is simple, the test has been found to categorise a wide range of liquids reliably, and in agreement with currently existing laboratory tests and expert judgement. It has also been found to be sensitive enough to demonstrate small changes in thickness associated with change in serving temperature.

IDDSI Flow Test

The IDDSI Flow test uses a 10 mL slip tip hypodermic syringe, as shown in the image below.



Although 10 mL syringes were initially thought to be identical throughout the world based on reference to an ISO standard (ISO 7886-1), it has subsequently been determined that the ISO document refers only to the nozzle of the syringe and that variability in barrel length and dimensions may exist between brands. Specifically the IDDSI Flow test uses a reference syringe with a measured length of 61.5 mm from the zero line to the 10 mL line (BD™ syringes were used for the development of the tests – manufacturer code 301604). IDDSI is aware that there are some syringes that are labeled as 10 mL, but in fact have a 12 mL capacity. Results using a 12 mL syringe will be different to those from a true 10 mL syringe. As a result it is important to check the barrel length as shown on the diagram below. Details for conducting the test are shown below.

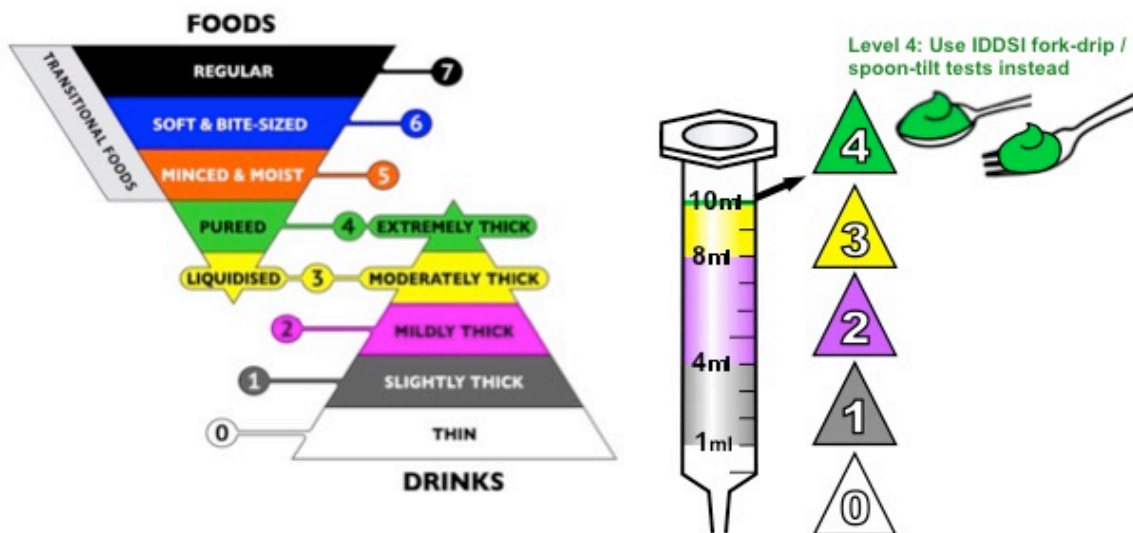
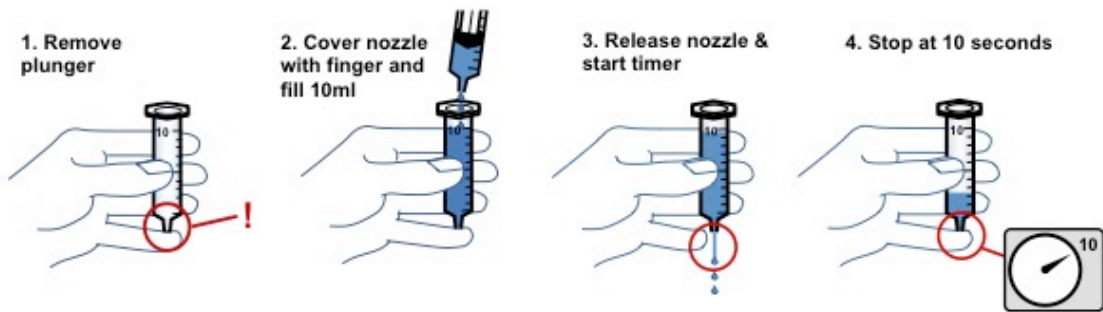
Videos showing the IDDSI Flow Test can also be viewed at: <http://iddsi.org/framework/drink-testing-methods/>

Drinks and liquids such as gravy, sauces and nutritional supplements are best assessed using the IDDSI Flow Test (Levels 0-3). For extremely thick drinks (Level 4), that do not flow through a 10 mL syringe in 10 seconds and are best consumed with a spoon, the IDDSI Fork Test and/or Spoon Tilt Test are recommended as methods for determining consistency.

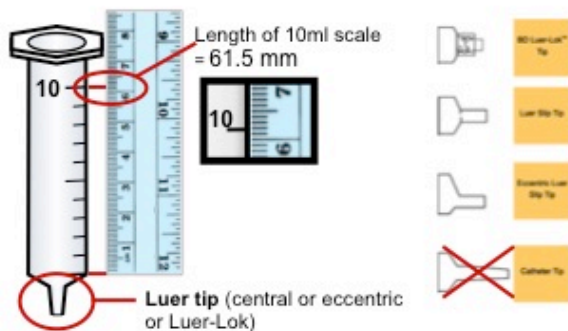
The IDDSI flow test to classify liquid thickness

The International Dysphagia Diet Standardisation Initiative (IDDSI) framework of terminology and definitions includes an objective measurement tool for liquid thickness.

The syringe flow test classifies IDDSI Levels 0-3 based on their rate of flow.



Specifications: It is essential to use the following syringe dimensions for correct results.



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Foods

Research to date in the area of food texture measurement requires complex and expensive machinery such as Food Texture Analysers. Given the difficulty with access to such equipment and the expertise required for testing and interpretation, many existing national terminologies have used detailed descriptors to describe food texture instead.

The systematic review demonstrated that the properties of hardness, cohesiveness and slipperiness were important factors for consideration (Steele et al., 2015). In addition, size and shape of food samples have been identified as relevant factors for choking risk (Kennedy et al., 2014; Chapin et al., 2013; Japanese Food Safety Commission, 2010; Morley et al., 2004; Mu et al., 1991; Berzlanovich et al. 1999; Wolach et al., 1994; Centre for Disease Control and Prevention, 2002, Rimmell et al., 1995; Seidel et al., 2002).

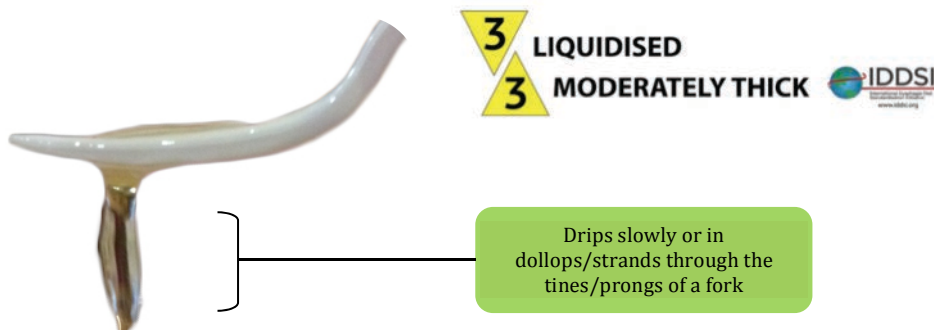
In view of this information, measurement of foods needs to capture both the mechanical properties (e.g. hardness, cohesiveness, adhesiveness etc.) and the geometrical or shape attributes of the food. The IDDSI descriptions of food texture and characteristics, food texture requirements and restrictions have been generated from existing national terminologies and the literature describing properties that increase risk for choking.

A combination of tests may be required to determine which category a food fits into. Testing methods for purees, soft, firm and solid foods include: The Fork Drip test, Spoon Tilt test, Fork or Spoon Pressure Test, Chopstick Test and Finger test. Videos showing examples of these testing methods can be found at: <http://iddsi.org/framework/food-testing-methods/>

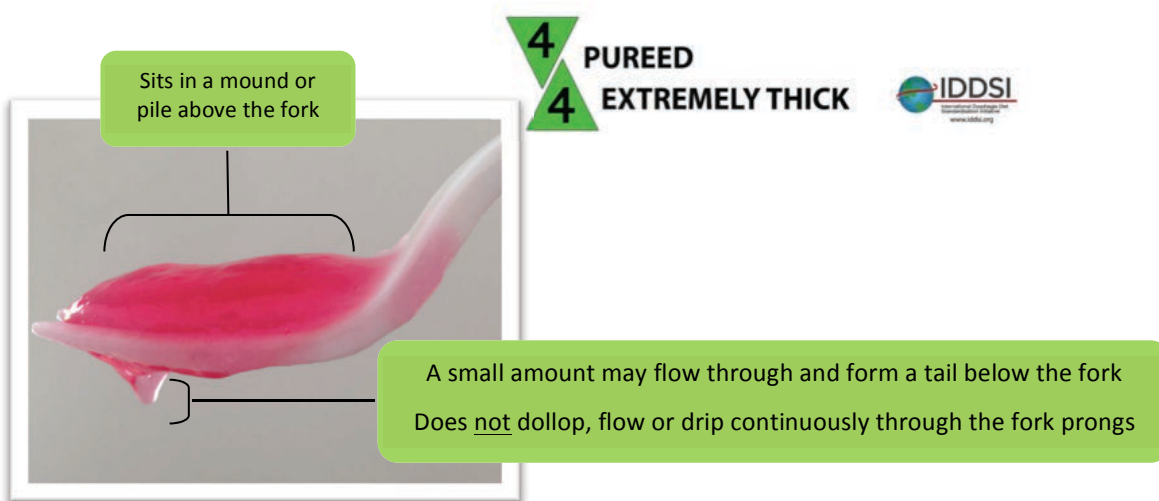
Fork Drip Test

Thick drinks and fluid foods (Levels 3 and 4) can be tested by assessing whether they flow through the slots/prongs of a fork and comparing against the detailed descriptions of each level. Fork drip tests are described in existing National terminologies in Australia, Ireland, New Zealand and the United Kingdom (Atherton et al., 2007; IASLT and Irish Nutrition & Dietetic Institute 2009; National Patient Safety Agency, Royal College Speech & Language Therapists, British Dietetic Association, National Nurses Nutrition Group, Hospital Caterers Association 2011).

Images for Level 3 - Liquidised/Moderately Thick are shown below.



Images for Level 4 - Pureed/Extremely Thick are shown below.

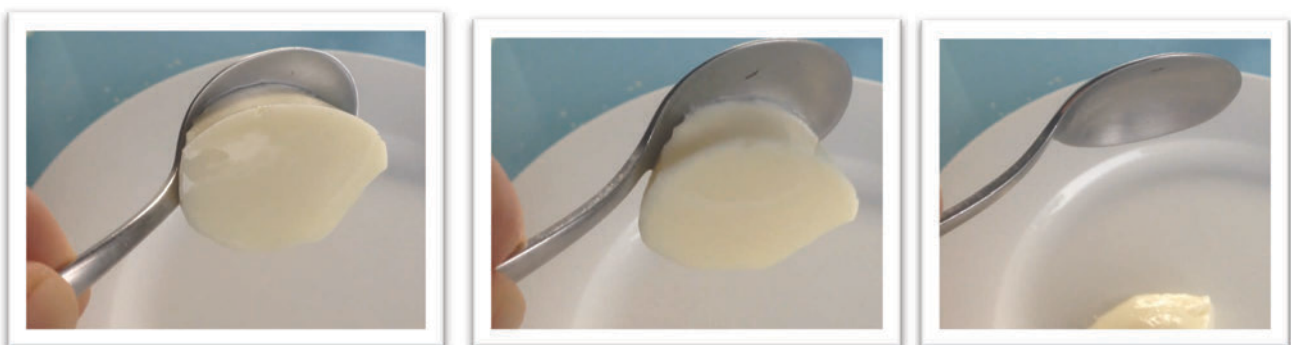


Spoon Tilt Test

The spoon tilt test is used to determine the stickiness of the sample (adhesiveness) and the ability of the sample to hold together (cohesiveness). The Spoon Tilt Test is described in existing National terminologies in Australia, Ireland, New Zealand and the United Kingdom (Atherton et al., 2007; IASLT and Irish Nutrition & Dietetic Institute 2009; National Patient Safety Agency, Royal College Speech & Language Therapists, British Dietetic Association, National Nurses Nutrition Group, Hospital Caterers Association 2011).

The Spoon Tilt Test is used predominantly for measures of samples in levels 4 and 5. The sample should:

- Be cohesive enough to hold its shape on the spoon
- A full spoonful must slide/pour off the spoon if the spoon is tilted or turned sideways or shaken lightly; the sample should slide off easily with very little food left on the spoon; i.e. the sample should not be sticky
- A scooped mound may spread or slump very slightly on a plate



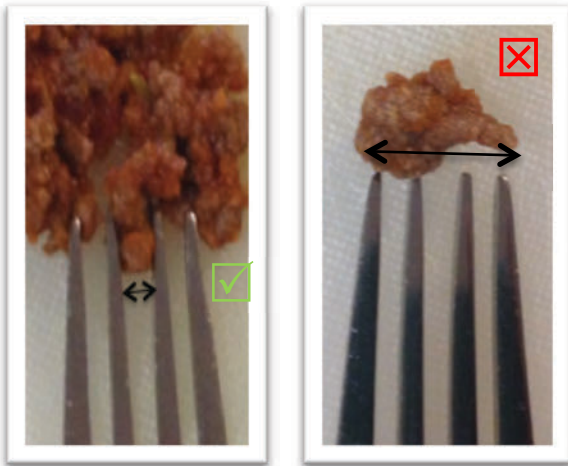
Soft, firm and hard food texture assessment

For soft, hard or firm food, the fork has been chosen to assess food texture as it can uniquely be used for assessment of mechanical properties associated with hardness, in addition to assessment of shape attributes such as particle size.



Assessing for 4mm particle size compliance

For adults, the average particle size of chewed solids foods before swallowing measures 2-4 mm (Peyron et al., 2004; Woda et al., 2010). The slots/gaps between the tines/prongs of a standard metal fork typically measure 4 mm, which provides a useful compliance measure for particle size of foods at Level 5 Minced & Moist. For determining particle size safety for infants, samples that are smaller than the maximum width of the child's fifth fingernail (littlest finger) should not cause a choking risk as this measurement is used to predict the internal diameter of an endotracheal tube in the paediatric population (Turkistani et al., 2009).



Compliance with 4mm particle size can be demonstrated with a fork as shown in the images opposite.

Assessing for 15mm (1.5cm) particle size compliance

For hard and soft solid foods, a maximum food sample size of 1.5 x 1.5 cm is recommended, which is the approximate size of the adult human thumb nail (Murdan, 2011). The entire width of a standard fork also measures approximately 1.5cm as shown in the images below. 1.5 x 1.5 cm particle size is recommended for Level 6 - Soft & Bite-sized to reduce risk associated with asphyxiation from choking on food (Berzlanovich et al., 2005; Bordsky et al., 1996; Litman et al., 2003).



Fork Pressure Test and Spoon Pressure Test

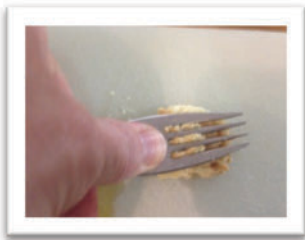


A fork can be applied to the food sample to observe its behaviour when pressure is applied. Pressure applied to the food sample has been quantified by assessment of the pressure needed to make the thumb nail blanch noticeably to white, as demonstrated by the arrows in the image at left.

The pressure applied to make the thumb nail blanch has been measured at ~ 17 kPa. This pressure is consistent with tongue force used during swallowing (Steele et al., 2014). In the image at right, pressure is being demonstrated in kilopascals using an Iowa Oral Performance Instrument. This is one device that can be used to measure tongue pressure.



Image used with permission by IOPI Medical



For assessment using the Fork Pressure Test, it is recommended that the fork be pressed onto the food sample by placing the thumb onto the bowl of the fork (just below the prongs) until blanching is observed, as shown in the image at left. It is appreciated that forks are not readily available in some parts of the world. Pressure applied using the base of a teaspoon may provide a useful alternative.

Chopstick Test and Finger test

Assessment with chopsticks has been included in the IDDSI. Finger tests have been incorporated in recognition that this may be the most accessible method in some countries.

Transitional food texture assessment

Transitional food textures are those that start as one texture (e.g. firm solid) and change into another texture specifically when moisture (e.g. water or saliva) is applied, or when a change in temperature occurs (e.g. heating). This food texture is used in developmental teaching or rehabilitation of chewing skills. For example it has been used in the development of chewing in the paediatric population and developmental disability population (Gisel 1991; Dovey et al., 2013).

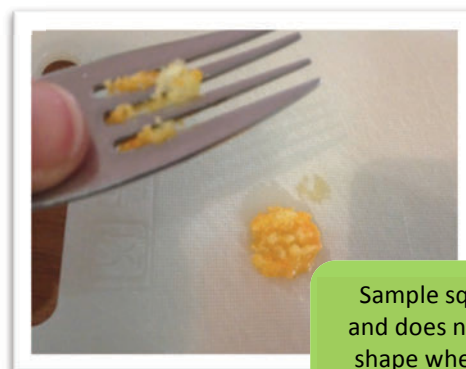
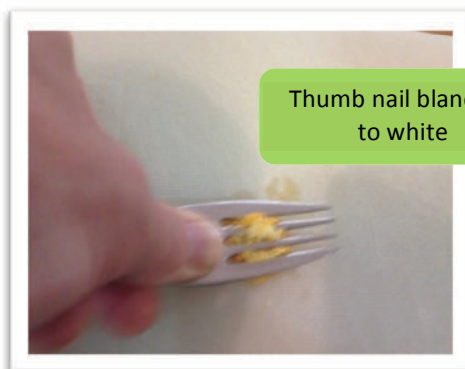
To assess whether a sample fits the definition of a transitional food, the following method is applied:

Use a sample the size of the thumb nail (1.5 cm x 1.5 cm), place 1 ml of water on the sample and wait one minute. Apply fork pressure using the base of the fork until the thumbnail blanches to white. The sample is a transitional food texture if after removing the fork pressure:

- The sample has been squashed and disintegrated and no longer looks like its original state when the fork is lifted
- The sample can be easily broken apart using chopsticks with minimal pressure.
- The sample breaks apart completely by rubbing the sample between the thumb and index finger and does not return to its initial shape.
- Or it has melted significantly and no longer looks like its original state (e.g. ice chips).

- Apply 1 ml of water to sample
- Wait 1 minute

TRANSITIONAL FOODS



Future studies

Further work is required to develop an inexpensive but accurate tool to assist with food texture analysis.

***Accompanying documents (<http://iddsi.org/framework/>):**

- IDDSI Testing Methods
- IDDSI Evidence
- IDDSI Frequently Asked Questions (FAQs)

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This document provides details regarding Levels of Evidence that support the IDDSI Framework.

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Evidence to support the IDDSI Framework

A systematic review of the literature was conducted to examine the impact of drink thickness and food texture on swallowing behaviour across the age spectrum. The systematic review was peer-reviewed and published Open Access in the Dysphagia Journal (Steele et al., 2015 Dysphagia, 30(1): 2-26; doi: [10.1007/s00455-014-9578-x](https://doi.org/10.1007/s00455-014-9578-x)).

Liquids

With regards to liquids, the results of the systematic review determined:

- Thicker liquids reduce the risk of penetration–aspiration, but also increase the risk of post-swallow residue in the pharynx
- The literature was insufficient to support the delineation of specific viscosity boundaries or other quantifiable material properties related to these clinical outcomes

Of the 36 studies that met the eligibility criteria for the systematic review, 26 related to function in healthy populations whilst only 10 were related to individuals with dysphagia. Of these 10 studies, one related to infants and the remainder investigated swallowing function in adults with neurological or neurogenic conditions, or dysphagia associated with treatment for oropharyngeal or nasopharyngeal cancer.

The results of IDDSI's international stakeholder surveys demonstrated common use of thin drinks plus three levels of increasing drink thickness for the management of swallowing problems across the age spectrum. The systematic review also found research investigating the impact of thickened drinks according to this general framework (i.e., thin drinks plus three levels of increasing thickness) and described using labels previously found in previous national terminologies such as Nectar/Syrup/Level 150/Mildly thick; Honey/Custard/Level 400/Moderately thick and Pudding/Spoon thick/ Level 900/Extremely thick (Steele et al., 2015, Dysphagia, 30(1): 2-26). In addition, paediatric stakeholders reported common use of a drink thicker than water but thinner than the commencement point of thickened liquids commonly used for adults. This level has been incorporated into the IDDSI Framework as Level 1 – Slightly Thick. Level 1 – Slightly thick drinks has also been verified as distinct from other thickness levels in the literature, however, as with all other thickened liquids, this level lacks data to determine the exact thickness required for therapeutic benefit.

Given the paucity of research regarding therapeutic thickness levels for thickened drinks, the IDDSI framework is based on an understanding that increasing thickness has a demonstrated therapeutic benefit for reducing the risk of penetration/aspiration. The number of levels of drink thickness included in the framework and recommended for best practice is based on clinical experience, stakeholder consensus and expert opinion.

The systematic review points to an urgent need to conduct quality research to determine thickness levels that provide therapeutic benefit by reducing risk for penetration/aspiration and/or improving swallowing function.

Foods

With regards to foods, the results of the systematic review determined:

- The best available evidence regarding the selection of an optimal food consistency for a person with dysphagia comes from the careful exploration of tolerance for different foods in a comprehensive clinical swallowing assessment;
 - Thicker and harder items require greater effort in oral processing and swallowing
- Note, terms related to choking, airway obstruction or asphyxiation were *not* included in the search strategy for this review

Of the 36 studies that met the eligibility criteria for the systematic review, 18 studies related specifically to food with one article covering both healthy adults and children. 12 studies related to healthy adults and two related to healthy children whilst five related to adults with dysphagia. Of these five studies, two related to neurological conditions, two specifically to stroke, one study to dysphagia following head and neck surgery, and one to individuals with dysphagia of mixed aetiology.

The results of international stakeholder surveys demonstrated the common use of regular food plus four to five levels of food texture modification for the management of swallowing problems across the age spectrum. A synthesis of the literature from the systematic review demonstrates broadly that solid, hard and adhesive (sticky) foods require an increased chewing rate, longer chewing duration and greater muscle effort. Pureed food requires the shortest chewing duration, least chewing and muscle effort. During normal chewing, the tongue and jaw move in a coordinated way to avoid injury from biting the tongue during chewing. This means, however, that there is no posterior tongue-to-palate seal during the chewing and oral processing of foods. This is in contrast to the pattern expected with liquids (Hiitemae & Palmer, 1999). It is not uncommon for particles of masticated food to collect in the pharynx, usually in the vallecular space, during oral preparation. Foods that require chewing do present a choking risk. Poor dentition and neurological conditions are consistently identified as risk factors for choking (Kennedy et al., 2014). In healthy people, regardless of the initial state of the food, after oral processing and at the point of swallow initiation, the bolus is a cohesive mass.

The paucity of research into the therapeutic use of food texture modification for dysphagia management means that the recommendations in this document regarding food texture are based on an understanding that altering food texture modification has demonstrated a therapeutic benefit for reducing the risk of choking. Recommendations regarding best practice are also based on clinical experience, surveys of reported practice patterns and expert opinion regarding the number of levels of food textures reported.

There is an urgent need to generate clear descriptions for different classes of chewable food, so that empirical evidence can be collected to demonstrate associated differences in oral processing and swallowing behavior.

Current and planned research

IDDSI is aware of current and planned research studies of general and clinical populations using IDDSI framework stimulus items. IDDSI looks forward to updating the Evidence as these studies are published.

Variable	Reference	Grade of Evidence
Investigations of Level 3 – Moderately thick/Liquidised in the research literature	As noted in Steele et al. (2015): Butler et al., 2004 Chi-Fishman & Sonies, 2002 Igarashi et al., 2010 Inagaki et al., 2008 Inagaki et al., 2009a Inagaki et al., 2009b Steele & Van Lieshout, 2004 Steele & Van Lieshout, 2005 Youmans et al., 2009	III-2 IV IV IV IV IV IV IV IV III-2
Investigations of Level 4 – Extremely thick / Pureed in the research literature	As noted in Steele et al. (2015): Barata et al., 2013 Bingjie et al., 2010 Bisch et al., 1994 Butler et al., 2004 Chen et al., 1992 Chi-Fishman & Sonies, 2002 Dos Santos et al., 2011 Gisel, 1991 Inagaki et al., 2008 Inagaki et al., 2009a Inagaki et al., 2009b Ishida et al., 2002 Kim & Han, 2005 Lin et al., 2011 Newman et al., 2016 Reimers-Neils et al., 1994 Taniwaki et al., 2013 Troche et al., 2008 Youmans et al., 2009	III-2 IV III-2 III-2 IV IV IV III-2 IV IV IV IV IV III-2 IV III IV IV IV III-2
Drinks that are too thick increase the risk of post swallow residue in the pharynx	Hind et al., (2012) Newman et al. (2016) Robbins et al., (2008)	IV III II
Investigations of Level 5 – Minced & Moist In the research literature	Nil to date	
Investigations of Level 6 - Soft In the research literature	As noted in Steele et al. (2015): Anderson et al., 2002 Ashida et al., 2007 Funami et al., 2012 Ishida et al., 2002 Lee et al., 2012 Nagatomi et al., 2008 Taniwaki et al., 2013	III-2 IV IV IV IV IV IV IV
Investigations of Level 7 - Regular In the research literature	As noted in Steele et al. (2015): Anderson et al., 2002 Ashida et al., 2007	III-2 IV IV

Variable	Reference	Grade of Evidence
Investigation of Level 7 – Regular In the research literature contd.	Barata et al., 2013 Binjie et al., 2010 Chen et al., 1992 Hoebler et al., 1998 Ishida et al., 2002 Karkazis, 2002 Karkakazis & Kossioni, 1997 Karkakazis & Kossioni, 1998 Nagatomi et al., 2008 Ruark et al., 2002 Saitoh et al., 2007	IV III-2 IV IV IV IV IV IV IV III-2 IV
Investigations of Mixed consistency foods In the research literature	As noted in Steele et al. (2015): Kim & Han, 2005 Lee et al., 2012 Saitoh et al., 2007	III-2 IV IV IV
Investigations of Transitional Foods In the research literature	As noted in Steele et al., (2015): Gisel, 1991	III-2 III-2
	Dovey et al., 2013	IV
Investigations of foods that are a choking risk In the research literature	Berzlanovich et al., 1999 Chapin et al., 2013 Centre for Disease Control and Prevention, 2002 Japanese Food Commission, 2010 Kennedy et al., 2014 Morely et al., 2004 Mu et al., 1991 Rimmell et al., 1995 Seidel et al., 2002 Siddell et al., 2013 Wick et al., 2006	III-2 III-2 III-2 III-3 III-3 III-2 III-2 III-2 IV III-2 III-3
Investigations of food particle size and bite size In the research literature	Peyron et al., 2004 Woda et al., 2010 Archambault et al., 2010 Fotijn-Tekamp et al. 2004 Jalabert-Malbos et al., 2007	IV IV IV IV IV

Grading of evidence – National Health and Medical Research Council (2009)

I ^a	Evidence from systematic review of level II studies
II	Evidence from a randomized control trial
III-1	Evidence from well-designed pseudo-randomised controlled trials (e.g., alternate allocation or some other method)
III-2	Evidence from comparative studies with concurrent controls and allocation not randomised experimental trial; cohort studies, case-control studies, or interrupted time-series with a control group (i.e. non-consecutive cohort study)
III-3	Evidence from comparative studies without concurrent controls, historical control study, two or more single-arm studies, or interrupted time series without a parallel control group
IV	Evidence from case series, either post-test or pre-test and post-test, or superseded reference standards

^a“A systematic review will only be assigned a level of evidence as high as the studies it contains, excepting where those studies are of level II evidence.”

***Accompanying documents (<http://iddsi.org/framework/>):**

- IDDSI Testing Methods
- IDDSI Evidence
- IDDSI Frequently Asked Questions (FAQs)

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